LISTERIOSIS

DISEASE REPORTING

In Washington:

DOH receives 11 to 19 reports of listeriosis per year; an average of 3 deaths are reported to be associated with *Listeria* infections each year.

Frequently named sources in Washington include contaminated food (particularly hot dogs and deli items, vegetables, and raw milk or milk products) and animals. Vertical transmission of *Listeria* from a woman to her fetus or newborn is possible.

Purpose of reporting and surveillance:

- To identify sources of transmission (e.g., a commercial product) and to prevent further disease transmission from such sources.
- To better characterize the epidemiology of this organism.

Reporting requirements:

- Health care providers: **immediately notifiable to Local Health Jurisdiction**
- Hospitals: **immediately notifiable to Local Health Jurisdiction**
- Laboratories: notifiable to Local Health Department within 2 workdays; specimen submission required
- Local health jurisdictions: notifiable to DOH Communicable Disease Epidemiology within 7 days of case investigation completion or summary information required within 21 days

CASE DEFINITION FOR SURVEILLANCE

Clinical criteria for diagnosis:

In adults, invasive disease caused by *Listeria monocytogenes* manifests most commonly as meningitis or bacteremia; infection during pregnancy may result in fetal loss through miscarriage or stillbirth, or neonatal meningitis or bacteremia. Other manifestations can also be observed.

Laboratory criteria for diagnosis:

- Isolation of *L. monocytogenes* from a normally sterile site (e.g., blood or cerebrospinal fluid or, less commonly, joint, pleural, or pericardial fluid).
- In the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue.

Case definition:

- Confirmed: a clinically compatible case that is laboratory confirmed.

The usefulness of other laboratory methods such fluorescent antibody testing or polymerase chain reaction to diagnose invasive listeriosis has not been established.

A. DESCRIPTION

1. Identification

A bacterial disease usually manifested as meningoencephalitis and/or septicemia in newborns and adults; manifestations in pregnant women are fever and abortion. Those at highest risk are neonates, the elderly, immunocompromised individuals and pregnant women. The onset of meningoencephalitis (which is rare in pregnant women) can be sudden, with fever, intense headache, nausea, vomiting and signs of meningeal irritation, or may be subacute, particularly in an immunocompromised or elderly host. Delirium and coma may appear early; occasionally there is collapse and shock. Endocarditis, granulomatous lesions in the liver and other organs, localized internal or external abscesses, and pustular or papular cutaneous lesions may occur on rare occasion.

The normal host who acquires infection may exhibit only an acute, mild, febrile illness, but, in pregnant women infection can be transmitted to the fetus. Infants may be stillborn, born with septicemia, or develop meningitis in the neonatal period even though the mother may be asymptomatic at delivery. The postpartum course of the mother is usually uneventful, but the case-fatality rate is 30% in newborn infants and approaches 50% when onset occurs in the first 4 days. In a recent epidemic, the overall case-fatality rate among nonpregnant adults was 35%: 11% in those less than 40 years old and 63% in those more than 60 years of age.

Diagnosis is confirmed by isolation of the infectious agent from CSF, blood, amniotic fluid, placenta, meconium, lochia, gastric washings and other sites of infection. *Listeria monocytogenes* can be isolated readily from normally sterile sites on routine media, but care must be taken to distinguish this organism from other gram-positive rods, particularly diphtheroids. Isolations from contaminated specimens are more frequent with improved selective enrichment media. Microscopic examination of CSF or meconium permits presumptive diagnosis; serologic tests are unreliable.

2. Infectious Agent

Listeria monocytogenes, a gram-positive rod shaped bacterium; human infections are usually caused by serovars 1/2a, 1/2b and 4b.

3. Worldwide Occurrence

An uncommonly diagnosed infection; in the US, the incidence of illness severe enough to require hospitalization is about 1/200,000 population. Typically, it occurs sporadically; however, several outbreaks that occurred in all seasons were recognized in recent years. About 30% of clinical cases occur within the first three weeks of life; in nonpregnant adults, infection occurs mainly after age 40. Nosocomial acquisition has been reported. Asymptomatic infections probably occur at all ages, although these are of importance only during pregnancy. Abortion can occur at any point in pregnancy but it usually occurs in the second half; perinatal infection is acquired during the last trimester.

4. Reservoir

The principal reservoir of the organism is in soil, forage, water, mud and silage. The seasonal use of silage as fodder is frequently followed by an increased incidence of listeriosis in animals. Other reservoirs include infected domestic and wild mammals, fowl and people. Asymptomatic fecal carriage is common in humans (up to 10%) and has been much higher in abattoir workers and laboratory workers who work with *Listeria monocytogenes* cultures. Soft cheeses may support the growth of *Listeria* during ripening and have caused outbreaks. Unlike most other foodborne pathogens, *Listeria* tends to multiply in refrigerated foods that are contaminated.

5. Mode of Transmission

Outbreaks of listeriosis have been reported in association with ingestion of raw or contaminated milk, soft cheeses, vegetables, and ready-to-eat meats, such as pate. A substantial proportion of sporadic cases of listeriosis result from foodborne transmission. Papular lesions on hands and arms may occur from direct contact with infectious material.

In neonatal infections, the organism can be transmitted from mother to fetus in utero or during passage through the infected birth canal. There are rare reports of nursery outbreaks attributed to contaminated equipment or materials.

6. Incubation period

Variable; outbreak cases have occurred 3-70 days following a single exposure to an implicated product. Median incubation is estimated to be 3 weeks.

7. Period of communicability

Mothers of infected newborn infants can shed the infectious agent in vaginal discharges and urine for 7-10 days after delivery, rarely longer. However, infected individuals can shed the organisms in their stools for several months.

8. Susceptibility and resistance

Fetuses and newborn infants are highly susceptible. Children and young adults generally are resistant, adults less so after age 40, especially the immunocompromised and the elderly. Disease is usually superimposed on other debilitating illnesses such as cancer, organ transplantation, diabetes and AIDS. There is little evidence of acquired immunity, even after prolonged severe infection.

B. METHODS OF CONTROL

1. Preventive measures:

a. Pregnant women and immunocompromised individuals should avoid soft cheeses such as Brie, Camembert, and Mexican style cheeses. They should cook, until steaming hot, leftover foods or foods such as hot dogs. They should avoid deli meats and eat only properly cooked meats and pasteurized dairy products. They should also avoid contact with potentially infective materials, such as aborted animal fetuses on farms.
b. Ensure safety of foods of animal origin. Pasteurize all dairy products where possible. Irradiate soft cheeses after ripening or monitor nonpasteurized dairy products, such as soft cheeses, by culturing for *Listeria*.
c. Processed foods that are found to be contaminated by *Listeria monocytogenes* (e.g., during routine bacteriologic surveillance) should be recalled.
d. Thoroughly wash raw vegetables before eating.
e. Thoroughly cook raw food from animal sources such as beef, pork, or poultry.
f. Wash hands, knives, and cutting boards after handling uncooked foods.
g. Avoid the use of untreated manure on vegetable crops.
h. Veterinarians and farmers should take proper precautions in handling aborted fetuses and sick or dead animals, especially sheep that died of encephalitis.

2. Control of patient, contacts and the immediate environment:

a. Report to local health authority.
b. Isolation: Enteric precautions.
c. Concurrent disinfection: None.
d. Quarantine: None.
e. Immunization of contacts: None.
f. Investigation of contacts and source of infection: Case surveillance data should be analyzed frequently for possible clusters; all suspected clusters should be investigated for common-source exposures.
g. Specific treatment: Penicillin or ampicillin alone or together with aminoglycosides. For penicillin-allergic patients, TMP-SMX or erythromycin is preferred. Cephalosporins, including third generation cephalosporins, are not effective in the treatment of clinical listeriosis. Tetracycline resistance has been observed. A gram-stained smear of meconium from clinically suspected newborn infants should be

examined for short gram-positive rods resembling *L. monocytogenes*. If positive, prophylactic antibiotics should be administered as a precaution.

3. Epidemic measures

Investigate outbreaks to identify a common source of infection, and prevent further exposure to that source.

4. International measures

None.